# CHEMICAL ENGINEERING (BS) - ENERGY & SUSTAINABILITY TRACK

## Degree Requirements

| Code | Title | Hours |
|---|---|---|
| **General Education Requirements** | | **58** |
| Select General Education Requirements (p. 2) | | |
| **Major Requirements** | | |
| *Chemical Engineering Requirements* | | |
| Complete the following: | | |
| EG 101 | Intro to Engineering & Design (& Lab) (or EG 201 for LINK students) | 2 |
| EG 231 | Intro to Ethics and Economics | 3 |
| CH 201 & 201L | Organic Chemistry I and Organic Chemistry I Lab | 4 |
| CH 202 & 202L | Organic Chemistry II and Organic Chemistry II Lab | 4 |
| CHE 203 | Material and Energy Balances (Only two attempts are permitted to earn a grade of "C" or better. Failure to meet this requirement will result in dismissal from the program.) | 4 |
| CHE 311 | CHE Separations I | 3 |
| CHE 321 | Transport Phenomena I | 3 |
| CHE 322 | Transport Phenomena II | 3 |
| CHE 331 | CHE Thermodynamics I | 3 |
| CHE 332 | CHE Thermodynamics II | 3 |
| CHE 351 | Modeling Lab | 1 |
| CHE 352 | Measurement Lab | 1 |
| CHE 363 | Simulation of Chemical Process | 3 |
| CHE 372 | Chemical Reactor Design | 3 |
| CHE 421 | CHE Separations II | 3 |
| CHE 441 | Chem Engr Ops Lab I-W | 2 |
| CHE 442 | Chem Engr Ops Lab II - W | 2 |
| CHE 452 | Process Dynamics and Control | 3 |
| CHE 461 | Process Design I | 3 |
| CHE 462 | Process Design II | 3 |
| *Technical Elective* | | |
| Select one of the following courses: | | 3 |
| BLY 122 | General Biology II (required for Pre-Med status) [1] | |
| Biology - Any standard 200-level or higher course [2] | | |
| Chemistry - Any standard course higher than CH 202 [2] | | |
| Computer Info Sciences - Any standard 200-level or higher course [2] | | |
| MA 237 | Linear Algebra I | |
| MA 332 | Differential Equations II | |
| MA 354 | Comp Assist Math Modeling - W | |
| ST 315 | Applied Probability-Statistics | |
| ST 320 | Applied Stat Analysis | |
| Physics - Any standard course higher than PH 202 [2] | | |
| Engineering - Any standard 200-level or higher course (excluding EG 270, EG 360, ME 317) [2] | | |
| Other courses may be considered upon Chair approval | | |
| *Energy & Sustainability Track Requirements* | | |
| CH 265 & 265L | Introductory Analysis and Introductory Analysis Lab | 4 |
| *Energy & Sustainability Electives* | | |
| Choose one or two of the following courses: | | 3-6 |
| CHE 490 | Special Topics (Chemical Engineering Elective in Energy/Sustainability) | |
| CHE 494 | Directed Studies (in Energy/Sustainability) | |
| CHE 499 | Honors Senior Project (in Energy/Sustainability) | |
| *Advanced Engineering Electives* | | |
| Choose one or none of the following courses to make a total of two courses from Energy & Sustainability Electives and Advanced Engineering Electives: | | 3-0 |
| Any 300- or 400-level CHE course that is outside of the core program requirements | | |
| EG 450 | Intro to Systems Engineering (note - must select ChBE-related project option) | |
| CE 370 & CE 374 | Intro to Enviro Eng and Intro to Environmental Eng Lab | |
| CE 470 & CE 471 | Water-Wastewater Trtmnt Design and Water-Wastewater Design Lab | |
| EG 315 | Mechanics of Materials | |
| ME 326 | Materials Science | |
| ME 365 | Design of Fluid Power Systems | |
| ME 411 | Thermal System Design | |
| ME 452 | Combustion | |
| ME 453 | IC Engines | |
| ME 461 | Turbomachinery | |
| ME 463 | Intro. Biomedical Engineering | |
| EE 331 | Physical Electronics | |
| EE 439 | VSLI Technology-Fabrication | |
| EE 449 | Controls Lab | |
| EE 489 | Renewable Energy | |
| Other courses may be considered upon Chair approval | | |
| (Accelerated Bachelor's to Master's (ABM) students will take up to six hours of approved graduate coursework) | | |
| **Minor Requirements** | | |
| A minor is not required for this degree program. | | 0 |
| **Total Hours** | | **127** |

### Footnotes

1. Students following the Energy & Sustainability Track who wish to fulfill the requirements for Pre-Med status must also take Biochemistry (either CH 440 or BMD 321) as an additional course.
2. "Standard course" means a typical didactic course; not DIS, independent study, research, or similar.

### Notes

All undergraduates must complete two designated writing credit (W) courses, at least one of which must be in the student's major or minor.

A “C” grade or higher is required in all prerequisite courses. Appropriate software tools will be utilized in almost all CHE courses.

## General Education Requirements

| Code | Title | Hours |
|---|---|---|
| **Area I – Written Composition** | | |
| Complete the following: | | |
| EH 101 | English Composition I (Students who earn an English ACT score of 27, or a written SAT score of 610, can opt out of EH 101.) | 3 |
| EH 102 | English Composition II | 3 |
| or EH 105 | Honors Composition - H | |
| **Area II – Humanities & Fine Arts** | | |
| A. Select one of the following: | | 3 |
| EH 215 | Brit Lit before 1785 | |
| EH 216 | Brit Lit after 1785 | |
| EH 225 | Am Lit before 1865 | |
| EH 226 | Am Lit after 1865 | |
| EH 235 | World Lit before 1650 | |
| EH 236 | World Lit after 1650 | |
| B. Select one of the following: | | 3 |
| ARH 100 | Survey of Art | |
| ARH 103 | Art History I | |
| ARH 123 | Art History II | |
| ARS 101 | Art Appreciation | |
| DRA 110 | Introduction to Theatre | |
| MUL 101 | Introduction to Music | |
| C. Complete the following: | | |
| CA 110 | Public Speaking | 3 |
| **Area III – Natural Sciences & Mathematics** | | |
| Complete the following: | | |
| MA 125 | Calculus I | 4 |
| CH 131 & 131L | General Chemistry I and General Chemistry I Lab | 4 |
| CH 132 & 132L | General Chemistry II and General Chemistry II Lab | 4 |
| **Area IV – History, Social & Behavioral Sciences** | | |
| A. Select 3 hours from the following: | | 3 |
| HY 101 | HY of Western Civilization I | |
| HY 102 | HY of Western Civilization II | |
| HY 135 | US History to 1877 | |
| HY 136 | US History since 1877 | |
| B. Select 3 hours from the following: | | 3 |
| AN 100 | Intro to Cultural Anthropology | |
| AN 101 | Intro Archaeology-Bio Anthro | |
| CA 100 | Intro to Communication | |
| CA 211 | Interpersonal Comm | |
| ECO 215 | Prin of Microeconomics | |
| ECO 216 | Prin of Macroeconomics | |
| GEO 114 | People, Places, Environment | |
| GEO 115 | World Regional Geography | |
| GS 101 | Intro to Gender Studies | |
| IS 100 | Global Issues | |
| IST 201 | Seasons of Life | |
| PSC 130 | Intro to US Government | |
| PSY 120 | Introduction to Psychology (required for Pre-Med status) [1] | |
| PSY 250 | Life Span Development | |
| SY 109 | Introductory Sociology (required for Pre-Med status) [1] | |
| SY 112 | Social Problems | |
| C. Select a further 3 hours from either List A or B above in Area IV | | 3 |
| **Area V** | | |
| Complete the following: | | |
| MA 126 | Calculus II | 4 |
| MA 227 | Calculus III | 4 |
| MA 238 | Differential Equations I | 3 |
| BLY 121 | General Biology I | 3 |
| PH 201 & 201L | Calculus-Based Physics I and Calculus-Based Physics I Lab | 4 |
| PH 202 & 202L | Calculus-Based Physics II and Calculus-Based Physics II Lab | 4 |
| **Total Hours** | | **58** |

## Additional Information

It is important that students make adequate progress in the Chemical Engineering program. Satisfactory completion of a set of fundamental courses is required before a student is allowed to take advanced courses. Professional Component Standing (PCS) is awarded by the Chair of the Department when the student completes the College of Engineering PCS requirements and the Chemical Engineering PCS requirements.

### College of Engineering PCS Courses

A minimum grade of "C" is required in all of the courses listed below.

| Code | Title | Hours |
|---|---|---|
| EH 101 | English Composition I | 3 |
| EH 102 | English Composition II | 3 |
| CH 131 & 131L | General Chemistry I and General Chemistry I Lab | 4 |
| MA 125 | Calculus I | 4 |
| MA 126 | Calculus II | 4 |
| PH 201 | Calculus-Based Physics I (+Lab) | 4 |

### Chemical Engineering PCS Courses

A minimum grade of "C" is required in all of the courses listed below..

| Code | Title | Hours |
|---|---|---|
| CH 132 & 132L | General Chemistry II and General Chemistry II Lab | 4 |
| CH 201 & 201L | Organic Chemistry I and Organic Chemistry I Lab | 4 |
| MA 227 | Calculus III | 4 |
| MA 238 | Differential Equations I | 3 |
| BLY 121 | General Biology I | 3 |
| CHE 203 | Material and Energy Balances | 4 |

# Graduation Plan

(126 Total Hours)

The Sample 4-year plan is designed as a guide for students preparing for their course selections. This information provides only a suggested schedule. Actual course selections should be made in consultation with an advisor. Courses listed as Milestones are required to obtain Professional Component Standing (PCS). Two designated writing (W) courses are required with at least one course chosen from offerings in the student's major or minor. Courses carrying this required credit are identified in the University Bulletin by a W after the course title.

| Course | Title | Hours |
|---|---|---|
| **First Year** | | |
| **Fall** | | |
| MA 125 | Calculus I [1] | 4 |
| CH 131<br>& 131L | General Chemistry I<br>and General Chemistry I Lab [1] | 4 |
| EH 101 | English Composition I [1] | 3 |
| BLY 121 | General Biology I [1] | 3 |
| EG 101 | Intro to Engineering & Design (and EG 101 Lab) | 2 |
| **Milestone Notes** | | |
| Must complete at least 12 hours with a 2.0 or higher GPA | | |
| C-grade or higher required in all prerequisite courses | | |
| | **Hours** | **16** |
| **Spring** | | |
| MA 126 | Calculus II [1] | 4 |
| CH 132<br>& 132L | General Chemistry II<br>and General Chemistry II Lab [1] | 4 |
| EH 102 | English Composition II (or EH 105) [1] | 3 |
| PH 201<br>& 201L | Calculus-Based Physics I<br>and Calculus-Based Physics I Lab [1] | 4 |
| **Milestone Notes** | | |
| MA 125 | Calculus I | |
| CH 131<br>& 131L | General Chemistry I<br>and General Chemistry I Lab | |
| BLY 121 | General Biology I | |
| EH 101 | English Composition I (if not exempt) | |
| C-grade or higher required in all prerequisite courses | | |
| | **Hours** | **15** |
| **Second Year** | | |
| **Fall** | | |
| MA 227 | Calculus III [1] | 4 |
| CH 201<br>& 201L | Organic Chemistry I<br>and Organic Chemistry I Lab [1] | 4 |
| CHE 203 | Material and Energy Balances [1] | 4 |
| PH 202<br>& 202L | Calculus-Based Physics II<br>and Calculus-Based Physics II Lab | 4 |
| **Milestone Notes** | | |
| MA 126 | Calculus II | |
| PH 201<br>& 201L | Calculus-Based Physics I<br>and Calculus-Based Physics I Lab | |
| CH 132<br>& 132L | General Chemistry II<br>and General Chemistry II Lab | |
| EH 102<br>or EH 105 | English Composition II<br>or Honors Composition - H | |
| C-grade or higher required in all prerequisite courses | | |
| CHE 203: only two attempts permitted to obtain grade C or better | | |
| | **Hours** | **16** |
| **Spring** | | |
| MA 238 | Differential Equations I [1] | 3 |
| CH 202<br>& 202L | Organic Chemistry II<br>and Organic Chemistry II Lab | 4 |
| EG 231 | Intro to Ethics and Economics | 3 |
| Tech Elective | Technical Electives [2] | 3 |
| General Education | Area II or IV [2] | 3 |
| **Milestone Notes** | | |
| CHE 203 Summer not guaranteed | | |
| MA 238 | Differential Equations I | |
| CH 201<br>& 201L | Organic Chemistry I<br>and Organic Chemistry I Lab | |
| MA 227 | Calculus III | |
| C-grade or higher required in all prerequisite courses | | |
| | **Hours** | **16** |
| **Third Year** | | |
| **Fall** | | |
| CHE 311 | CHE Separations I | 3 |
| CHE 321 | Transport Phenomena I | 3 |
| CHE 331 | CHE Thermodynamics I | 3 |
| CHE 351 | Modeling Lab | 1 |
| CH 265<br>& 265L | Introductory Analysis<br>and Introductory Analysis Lab | 4 |
| General Education | Area II or IV [2] | 3 |
| **Milestone Notes** | | |
| C-grade or higher required in all prerequisite courses | | |
| CHE courses only available in Fall semester | | |
| | **Hours** | **17** |
| **Spring** | | |
| CHE 322 | Transport Phenomena II | 3 |
| CHE 332 | CHE Thermodynamics II | 3 |
| CHE 363 | Simulation of Chemical Process (Simulation of Chemical Process) | 3 |
| CHE 352 | Measurement Lab | 1 |
| CHE 372 | Chemical Reactor Design | 3 |
| General Education | Area II or IV [2] | 3 |
| **Milestone Notes** | | |
| C-grade or higher required in all prerequisite courses | | |
| CHE courses only available in Spring semester | | |
| | **Hours** | **16** |
| **Fourth Year** | | |
| **Fall** | | |
| CHE 421 | CHE Separations II | 3 |
| CHE 441 | Chem Engr Ops Lab I-W | 2 |
| CHE 452 | Process Dynamics and Control | 3 |
| CHE 461 | Process Design I | 3 |
| General Education | Area II or IV [2] | 3 |
| | Energy & Sustainability Elective [2] | 3 |
| **Milestone Notes** | | |
| Apply for graduation | | |
| C-grade or higher required in all prerequisite courses | | |
| CHE courses only available in Fall semester | | |
| | **Hours** | **17** |
| **Spring** | | |
| CHE 442 | Chem Engr Ops Lab II - W | 2 |
| CHE 462 | Process Design II | 3 |
| | Energy & Sustainability Elective II or Advanced Engineering Elective [2] | 3 |
| General Education | Area II or IV [2] | 3 |
| General Education | Area II or IV [2] | 3 |
| **Milestone Notes** | | |
| C-grade or higher required in all prerequisite courses | | |
| CHE courses only available in Spring semester | | |
| | **Hours** | **14** |
| | **Total Hours** | **127** |

1 Required for Professional Component Standing (PCS).
2 See Degree Requirements.

**Notes**

- CHE 300- and 400-level courses are offered only in the semesters indicated above.
- Students not Term 1-Calculus I ready will exceed the 126 hours required for this degree. Students with ACT Math scores 21 and below will not complete the degree in 4 years. Students beginning in MA 112 must utilize the summer before Term 3 to take MA 125 and CH 132/CH 132L and utilize the summer before Term 5 to complete the degree in 4 years. Students with ACT Math scores 23 and below should begin math courses in the summer before Fall-Year 1.